

I. AMENDMENTS TO THE CLAIMS:

Please cancel claims 3, 4, 8, 9, 12, 14 and 15 without prejudice. Kindly amend claims 1, 2, 5-7, 10, 11 and 13 as follows.

The following Listing of Claims replaces all prior listings, or versions, of claims in the above-captioned application.

LISTING OF CLAIMS:

1. (Currently Amended) A method of connecting ~~a plurality of plural~~ table-format data, each table-format data being expressed as a record array containing an entry and an entry value included in the entry, and converting the connected table-format data as join tables to a tree structure, the method ~~characterized by~~ comprising the steps of:

(a) ~~a step of~~ dividing each table-format data into one or more information blocks, each containing a value list in which entry values belonging to specified entries are stored in order of entry value numbers corresponding to the entry values and a pointer array in which pointer values for indicating the entry value numbers are stored in univocal order of record numbers;

(b) ~~a step of~~ selecting two table-format data in which an entry is to~~should~~ be made common;

(c) ~~a step of~~ finding an entry that is to~~should~~ be made common in the selected two table-format data;

(d) ~~a step of~~ determining table-format data on which default sorting order is reflected, as master table-format data, of ~~the~~ specified information blocks, and determining ~~the other~~ table-format data as slave table-format data;

(e) ~~a step of~~ associating a record ~~the master side with a corresponding record on the slave side in the selected table-format data~~ in the case where the value lists contained in the

specified information blocks are equalized with each other in the selected two table-format data, generating a master-side projection array for the master table-format data, wherein the master-side projection array is formed by summing up the number of times of duplication of each line, and generating a master-side ordered set for the master table-format data and also a slave-side projection array for the slave table-format data, wherein the slave-side projection array is formed by summing up the number of times of duplication of each line in a join table, and generating a slave-side ordered set for the slave table-format data, wherein the slave-side ordered set is sorted by entry used as a key for joining;

~~f)~~ (f) repeating steps (b), (c), (d) and (e), and when there is a table to be joined with the slave table-format data of the two table-format data, using the slave table-format data as master table-format data~~a step of selecting two other table-format data that regard the table-format data on the slave side of the former two table-format data, as the master side, and executing the step c) of finding an entry, the step d) of determining master table-format data and slave table-format data, and the step e) of associating, with respect to the other two table-format data;~~

~~g)~~ (g) generating a reverse mapping array between one join table and a subsequent join table using the master-side projection array as an original array for the subsequent join table~~a step of repeating the step f) with respect to table-format data that need to be joined;~~

~~(h) a step of selecting table-format data to be a root from the table-format data connected by joining, and determining depth of each table-format data in accordance with the connection of the table-format data;~~

~~(i) a step of securing an area for a tree description table having~~ as a value a combination of the depth and a record number,~~as a value;~~

(j) initializing a current depth to a depth of the table-format data to be the root of the tree structure;

~~(k) j) a step of specifying a record in the master-side ordered set for the join table corresponding to the current depth having certain depth that is initially the smallest depth, and arranging a value indicating the record together with the depth into the area for the tree description table;~~

~~(l) acquiring an element in the master-side ordered set for the subsequent join table by tracing the slave-side projection array and the slave-side ordered set corresponding to the master-side ordered set for the join table on the current depth, as well as, when present, the reverse mapping array and the master-side projection array for the subsequent join table k) a step of specifying a record of the table-format data on the slave side from the specified record, and arranging, on the basis of the record, a value indicating a record of table-format data that regards the table-format data on the slave side as the master side, together with the depth of the table-format data on the master side, into the area for the tree description table;~~
~~l) a step of repeating the step k) until depth where no table format data exist is reached or until no record exists any longer; and~~

~~(m) a step of repeating the steps (k) and (l) with sequentially searching in the direction of the depth until no further elements are acquired j) to l) to arrange a value specifying predetermined depth and record into the area for the tree description table, and thus completing the tree description table.~~

2. (Currently Amended) The method as described in claim 1, characterized in that in step (g) the reverse mapping array is omitted when the whole set of the table-format data is used the step e) comprises:

~~— a step of generating, in the information block on the master side, a second projection array for indicating the pointer array of the information block along with addition of the entry value when equalizing the value list;~~

~~———— a step of generating, in the information block on the slave side, a third projection array that sums up the number of values of entries that are made common; and~~
~~———— a step of generating, in the information block on the slave side, a fourth projection array, which is a set of values indicating records sorted by the entries that are made common;~~
~~———— wherein the second projection array, the pointer array of the information block on the master side, the third projection array and the fourth projection array are sequentially traced to specify a record on the slave side.~~

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The method as claimed in claim 1, ~~characterized by further~~ comprising the step of:

performing one of search, totaling and sorting with respect to the entry that is ~~to~~ should be made common in ~~of the table-format data,~~ of at least one of the two table-format data in which the entry is ~~to~~ should be made common.

6. (Currently Amended) A memory device storing a program for connecting a plurality of ~~plural~~ table-format data, each table-format data being expressed as a record array containing an entry and an entry value included in the entry, and converting the connected table-format data as join tables to a tree structure, the program characterized by causing a ~~the~~ computer operably connected to the memory device to execute the steps of:

(a) ~~a step of~~ dividing each table-format data into one or more information blocks, each containing a value list in which entry values belonging to specified entries are stored in order

of entry value numbers corresponding to the entry values and a pointer array in which pointer values for indicating the entry value numbers are stored in univocal order of record numbers;

(b) ~~a step of selecting two table-format data in which an entry is to~~should be made common;

(c) ~~a step of finding an entry that is to~~should be made common in the selected two table-format data;

(d) ~~a step of determining table-format data on which default sorting order is reflected, as master table-format data, of the specified information blocks, and determining the other table-format data as slave table-format data;~~

(e) ~~a step of associating a record the master side with a corresponding record on the slave side in the selected table-format data in the case where the value lists contained in the specified information blocks are equalized with each other~~ in the selected two table-format data, generating a master-side projection array for the master table-format data, wherein the master-side projection array is formed by summing up the number of times of duplication of each line, and generating a master-side ordered set for the master table-format data and also a slave-side projection array for the slave table-format data, wherein the slave-side projection array is formed by summing up the number of times of duplication of each line in a join table, and generating a slave-side ordered set for the slave table-format data, wherein the slave-side ordered set is sorted by entry used as a key for joining;

(f) repeating steps (b), (c), (d) and (e), and when there is a table to be joined with the slave table-format data of the two table-format data, using the slave table-format data as master table-format data ~~f) a step of selecting two other table-format data that regard the table-format data on the slave side of the former two table-format data, as the master side, and executing the step c) of finding an entry, the step d) of determining master table-format data~~

and slave table-format data, and the step e) of associating, with respect to the other two table-format data;

(g) generating a reverse mapping array between one join table and a subsequent join table using the master-side projection array as an original array for the subsequent join table~~g) a step of repeating the step f) with respect to table-format data that need to be joined;~~

~~(h) a step of selecting table-format data to be a root from the table-format data connected by joining, and determining depth of each table-format data in accordance with the connection of the table-format data;~~

~~(i) a step of securing an area for a tree description table having as a value a combination of the depth and a record number, as a value;~~

(j) initializing a current depth to a depth of the table-format data to be the root of the tree structure;

~~(k) j) a step of specifying a record in the master-side ordered set for the join table corresponding to the current depth having certain depth that is initially the smallest depth, and arranging a value indicating the record together with the depth into the area for the tree description table;~~

(l) acquiring an element in the master-side ordered set for the subsequent join table by tracing the slave-side projection array and the slave-side ordered set corresponding to the master-side ordered set for the join table on the current depth, as well as, when present, the reverse mapping array and the master-side projection array for the subsequent join table~~k) a step of specifying a record of the table-format data on the slave side from the specified record, and arranging, on the basis of the record, a value indicating a record of table-format data that regards the table-format data on the slave side as the master side, together with the depth of the table-format data on the master side, into the area for the tree description table;~~

~~l) a step of repeating the step k) until depth where no table-format data exist is reached or until no record exists any longer; and~~

~~(m) a step of repeating the steps (k) and (l) with sequentially searching in the direction of the depth until no further elements are acquired; j) to l) to arrange a value specifying predetermined depth and record into the area for the tree-description table, and thus completing the tree-description table.~~

7. (Currently Amended) The memory device storing the program as described in claim 6, wherein the program causes~~characterized by~~ causing the computer to execute the steps further characterized in that in step (g) the reverse mapping array is omitted when the whole set of the table-format data is used, at the step e):

~~—— a step of generating, in the information block on the master side, a second projection array for indicating the pointer array of the information block along with addition of the entry value when equalizing the value list;~~

~~—— a step of generating, in the information block on the slave side, a third projection array that sums up the number of values of entries that are made common; and~~

~~—— a step of generating, in the information block on the slave side, a fourth projection array, which is a set of values indicating records sorted by the entries that are made common;~~

~~—— the program being characterized by causing the computer to operate so that the second projection array, the pointer array of the information block on the master side, the third projection array and the fourth projection array are sequentially traced to specify a record on the slave side.~~

8. (Cancelled)

9. (Cancelled)

10. (Currently Amended) The memory device storing the program as claimed in claim 6, wherein the program further causes~~characterized by further causing~~ the computer to execute the step of:

performing one of search, totaling and sorting with respect to the entry that is ~~to~~should be made common in~~of the table-format data,~~ of at least one of the two table-format data in which the entry is ~~to~~should be made common.

11. (Currently Amended) The method as claimed in claim 2, ~~characterized by further~~ comprising the step of:

performing one of search, totaling and sorting with respect to the entry that is ~~to~~should be made common in~~of the table-format data,~~ of at least one of the two table-format data in which the entry is ~~to~~should be made common.

12. (Cancelled)

13. (Currently Amended) The memory device storing the program as claimed in claim 7, wherein the program further causes~~characterized by further causing~~ the computer to execute the step of:

performing one of search, totaling and sorting with respect to the entry that is ~~to~~should be made common in~~of the table-format data,~~ of at least one of the two table-format data in which the entry is ~~to~~should be made common.

14. (Cancelled)

15. (Cancelled)